

September 23, 2021

*“The Industrial World Needs a Different Approach to Data for Wireless Condition Based Monitoring to Be Truly Predictive.”*

## Wireless Vibration Sensor Deployment Pulp & Paper - Fan Application

### Background:

As the Mega Trend of Industry 4.0 and its various components such as IoT, AI, Big Data, Edge Computing and Cloud technology continue to gain traction, the industrial world is still determining how to get tangible results. Wireless sensor technology combined with Bluetooth and wireless networks open new worlds of possibility for scaling remote Condition Based Monitoring (CBM) to critical assets throughout entire plants. Covid19 is certainly accelerating the trend toward remote monitoring. It is easy to see why industrial companies have developed strategic initiatives to implement these technologies. It has been estimated there is a one trillion dollar cost due to unplanned downtime each year.

## THE INDUSTRIAL WORLD HAS A TRILLION DOLLAR PER YEAR PROBLEM CAUSED BY UNPLANNED DOWNTIME

Fortune Global 500 (FG500) manufacturing and industrial firms alone have annual losses due to unplanned downtime of **\$864B**



82% of FG500 Oil & Gas companies are focused on PREDICTIVE maintenance

\$47B Lost / Year  
\$220k Lost / Hr



67% of FG500 Automotive companies are focused on PREDICTIVE maintenance

\$557B Lost / Year  
\$1.3M Lost / Hr



60% of FG500 Heavy Industrial companies are focused on PREDICTIVE maintenance

\$225B Lost / Yr  
\$188k Lost / Hr



72% of FG500 FMCG companies are focused on PREDICTIVE maintenance

\$35B Lost / Year  
\$24k Lost / Hr

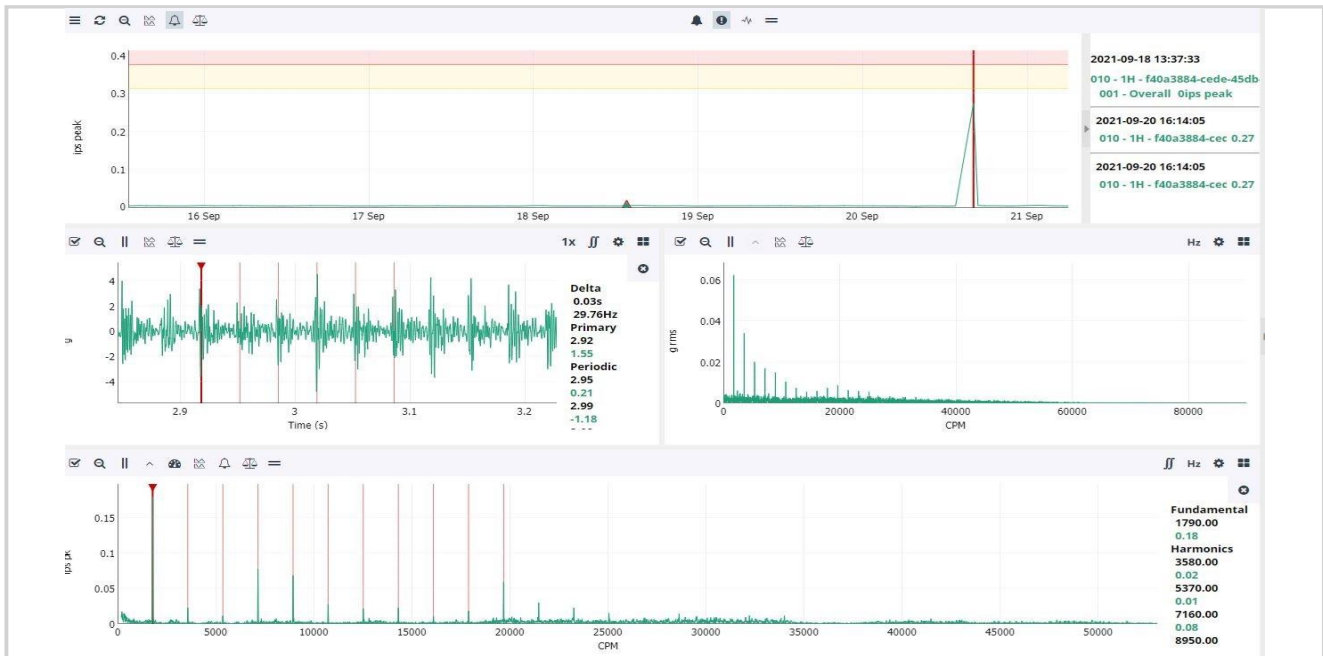
**Market Offering:**

There are many companies with wireless vibration offerings. However they have low resolution sensors that have proven to be limited in their effectiveness or late in catching negative trends in the data. In some cases, it is assumed that Artificial Intelligence (AI) can make up for the low resolution data being collected. However, at SpaceSense we take a different approach. We believe high quality data is the foundation of predictive systems. We have the highest resolution wireless vibration sensor on the market and the data collected twice per day can be used to determine not only the magnitude of a problem, but the root cause very early on the P-F Curve. This paper will explore a specific use case for a fan in the Pulp & Paper industry.

**Project:**

SpaceSense Systems and our partner RE&E were approached about deploying wireless sensors on critical rotating assets in a Pulp & Paper manufacturing facility. The sensors were installed on a “Wet End Supply Fan” on September 8<sup>th</sup> and 9<sup>th</sup>, 2021 during an extended outage. The mill ran the equipment so we could perform an initial scan on September 20<sup>th</sup> while they were still in an outage. The first scan revealed issues with the outboard fan bearing. The customer was notified on September 21<sup>st</sup> with a report detailing the problem. A section of that report is shown below.

SX3 - SpaceSense	
<b>Location:</b>	SpaceSense >> .....>> SX3 - 620778 >> 620778-Wet End Supply Fan 115-M-540 >> Fan Driven Outboard
<b>Assessment Date:</b>	9/21/2021 7:04:36 AM
<b>Job Type:</b>	PdM
<b>Severity:</b>	High
<b>Criticality:</b>	
<b>Work Request:</b>	
<b>Work Order #:</b>	
<b>Analyst Name:</b>	
<b>Analyst Email:</b>	<a href="mailto:analytics@sx3hub.com">analytics@sx3hub.com</a>
<b>Technology:</b>	Vibration Looseness
<b>Failure Mode:</b>	Bearing, spherical roller
<b>Part Name:</b>	
<b>Reason:</b>	Improper Clearance/Fit
<b>Previous Fault Entry:</b>	N/A
<b>Assessment Comment:</b>	Data reported [13-35 x RPM: High Alarm]
<b>Analysis Comment:</b>	Higher than desired vibration in the 13-35 orders range. Acceleration is within tolerances and waveform shows approximately 8 g's Pk-Pk with slight impacting at 1x RPM. Velocity Spectrum shows harmonics of operating speed throughout. Possible internal bearing looseness within housing. No fan assembly defects can be observed at this time due to high frequency noise floor. Once repair is completed, new vibration data will be examined to ensure blade damage is not present.
<b>Repair Recommendation:</b>	Ensure bearing housing oil cavity is clean and free of damage. Inspect for loose bearing fit within housing. verify proper loading of fan when complete. Check torque of all hold down bolts on outboard fan bearing.



The report indicated there was looseness in the bearing due to improper clearance or fit. The mill personnel immediately made plans to remove the top of the pillow block bearing to examine and verify the findings on September 22<sup>nd</sup>. Our partner RE&E was also present to assist. Pictures of the bearings housing and outer race are shown below. The outer race as well as the bearing housing showed clear signs of rotation, verifying exactly what the report predicted.



Our team received the following email from a technician at the plant:


“The picture of the bearing shows some evidence of outer race rotation. This is not good and bearing housing as well as the race needs replaced. This is the looseness that was detected on the report.”

### Conclusion:


This Pulp & Paper customer experienced the power of high-resolution data from our wireless sensor and how effective it can be at Condition Based Monitoring. The plant was able to address the issue while they were still down for their outage and avoid an unplanned downtime event in the future. Imagine the impact this solution could have when scaled to autonomously monitor every asset in your plant. The ROI (Return on Investment) is often in as little as three to nine months. In some cases, like this one, it can be immediate. The SpaceSense solution provides real and measurable value in each of the following areas.

## VALUE POOLS

 Prevent Unplanned Downtime


 Avoid Extensive Repair

 Avoid Rush Repair

 Reduce Inventory

 Reduce Vibration Routes

 Optimize Maintenance

 Reduce Emissions

 Improve Safety

Contact us to see how SpaceSense technology and our partners  
Can transform your business with the power of best-in-class wireless data.

SpaceSense (SX3)

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